AIR MINISTRY.

DEPARTMENT OF THE CONTROLLER-GENERAL OF CIVIL AVIATION.

HALF-YEARLY REPORT

ON THE

PROGRESS OF CIVIL AVIATION.

(April 1st, 1920—September 30th, 1920.)

Presented to Parliament by Command of His Majesty.

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INTRODUCTION.

The six months from April 1st to September 30th, 1920, covered by this, the third Half-yearly Report on the Progress of Civil Aviation, represents a period of consolidation rather than of radical change or innovation. The organisation, of which the initial stages were described in the previous Reports,* has been gradually improved to meet the steady increase in commercial air traffic and, within the limits set by practical utility and economy, to provide for its expansion in the future.

In conformity with the general structure of the last report, Part I of this report includes information regarding civil aviation in Great Britain and the Empire; and Part II describes the progress made in foreign countries. An appendix has been added, showing in tabular form the principal scheduled air services, which, according to the latest information available, are at present in operation.

PART I.—GENERAL AND BRITISH EMPIRE.

RELATIONS WITH FOREIGN COUNTRIES.

Several of the minor States have ratified the Air Convention, but a proposal has been put forward by the Air Ministry that, in order to save complications, ratifications should be deposited with the representatives in Paris of countries concerned, and that the final act of ratification at the Quai d'Orsay should not take place until an agreed date.

Article 5 of the Convention and the Protocol thereto still rendering it difficult for neutral countries to join the Air Convention, temporary agreements have been negotiated, but not yet signed, with Norway, Sweden, Denmark and Finland. Delay has been caused by the desire of the Scandinavian States to reach a definite agreement among themselves before making any compact with another foreign power.† In view, however, of the opening up of international communications between Sweden, Denmark, Holland, Germany and England, it is hoped that these agreements will shortly come into force.

Pending the ratification of the Air Convention and the institution of the International Commission of Aerial Navigation therein provided for monthly conferences have been held since April 1st between the Department of Civil Aviation and the French air authorities in order to discuss all matters connected with civil aviation affecting the two countries. These discussions have proved mutually beneficial in the solution of current problems, and the Belgian Government has accepted an invitation to take part, its representative having attended the last two meetings.

GROUND ORGANISATION.

(i) *Air Ports.* (*a*) *Aerodromes.*—Progress has been made in the adaptation of the two Government-owned customs aerodromes at Croydon and Lympne to the increasing needs of commercial aviation. During the past six months improvements have been carried out in regard to the general equipment of the aerodromes, sanitation, and the provision of medical services.

(*b*) *Coastal.*—The Board of Customs and Excise has agreed to grant customs facilities for seaplanes and flying-boats at certain ports to be selected on the south and east coasts

* "Synopsis of Progress of Work in the Department of Civil Aviation; 1st May, 1919, to 31st October, 1919" (Cmd. 418) (H.M. Stationery Office, 2*d.*).

"Synopsis of Progress of Civil Aviation in Foreign Countries; up to 31st October, 1919" (Cmd. 476) (H.M. Stationery Office, 1*d.*).

"Half-Yearly Report on the Progress of Civil Aviation; 1st October, 1919, to 31st March, 1920" (Cmd. 800) (H.M. Stationery Office, 3*d.*).

† This objection has now been withdrawn.

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as soon as arrangements for the moorings of this type of aircraft have been completed. The Admiralty has been approached with a view to altering the prohibited area at Sheerness so as to admit of the addition of a port on the Medway to this list.

In response to requests from representatives of the aircraft industry, permission has been granted, with the concurrence of the Admiralty, for the "taxi-ing" of seaplanes and flying boats on the surface of the water in prohibited areas, subject to any local by-laws which may be in force for the preservation of the safety of traffic.

(*c*) *River.*—Negotiations are being continued for the use of the Thames above Westminster Bridge by aircraft employed on mail services and other traffic. The use of this area would, however, be subject to certain restrictions as to the type of aircraft and the qualifications of the pilots concerned.

(ii) *Navigation.*—A compass-swinging base has been constructed on the Croydon Aerodrome, and arrangements have been made with the Society of British Aircraft Constructors whereby all compasses used in passenger or goods aircraft are in future to be provided with certificates from the Admiralty Compass Observatory.

The wireless direction-finding apparatus installed at Croydon has proved its value in enabling aircraft to correct their course in thick weather.

Pilots of aircraft equipped with the wireless telephone have found this apparatus of assistance to navigation since it enables them to keep in touch with intermediate points on the Continental routes, such as Lympne and St. Inglevert, and so check their position. Transport firms are now beginning to equip their machines with wireless.

The marking of the names of towns and railway junctions round London so as to be seen from the air has been continued, and important points about 20 miles distant are now being marked. Special attention is being paid to Continental air traffic routes.

Regular night flying for commercial purposes has not yet been attempted, but the experimental lighthouse at Croydon has proved of value to belated machines landing after dark. Two more experimental lighthouses are to be installed, one at Lympne and one midway between London and Folkestone. The civil aerodromes at Castle Bromwich, Manchester and Renfrew will be similarly equipped when the volume of night traffic renders this desirable.

Electric landing lights for indicating the direction for landing, as specified in the International Air Convention, are being installed on the ground at the Croydon aerodrome, and the system will be extended to other aerodromes as required, and in accordance with the results indicated. Trials are also being made at Croydon to test the value of powerful searchlights for locating the aerodrome and for lighting up temporary obstructions. Near the aerodromes at Croydon and Lympne high buildings are outlined with small lights, and the circuits to be made in accordance with the regulation of the Convention governing landing at aerodromes will be indicated by a system of small lights by night and flags by day.

Progress has been made in the compilation of text-books and charts. The Guide to British aerodromes, which gives much valuable information, not only to aviators, but to commercial firms dealing with supplies of all sorts for aviation, will soon be on sale, and the Navigation Manual for the Royal Air Force is nearing completion.

The Geographical Section of the War Office, which has undertaken the production of aeronautical general and local maps in accordance with the International Convention, has nearly completed general maps of the British Isles and of Mesopotamia, while the general map of Egypt, and that of the country from Mesopotamia to India, is well advanced. Agreement has been reached with France and Belgium as to the parts of Europe and Africa each country will undertake to map. The first sheet of a series of Local Aeronautical Maps of the British Isles, comprising Kent and part of Essex on a scale of $\frac{1}{200000}$, has been commenced. Pending the completion of this series, which will take some years, aerial information is being provided on existing ordnance maps, copies of which have been issued for sale at the Government aerodromes and to Royal Air Force units.

(iii) *Signals.*—During the six months under review the wireless stations for telephony and telegraphy have been opened at the aerodromes at Croydon, Lympne, Castle Bromwich, Manchester and Renfrew.

The network of wireless stations in the United Kingdom has dealt with a greatly increased volume of traffic. The Air Ministry station alone, in addition to Service messages, has received and transmitted 13,104 messages on behalf of the meteorological and

commercial air services, or more than twice the number dealt with in the previous six months, while the Croydon aerodrome has dealt with 11,888 messages of the same nature.

The system of notifying the arrivals and departures of aircraft between termini, *e.g.*, between London and Paris, Brussels and Amsterdam, has improved, the average time taken for a wireless message to reach its destination from the time it is handed in being from 10 to 12 minutes, as compared with about 2¼ hours for ordinary and 1 hour for "urgent" telegrams. The French, Belgian and Dutch authorities are rendering every assistance in expediting messages on behalf of air traffic.

Careful study has been given to framing the British proposals for the new Radio-telegraph and Telegraph Convention, with the object of including all forms of communication to and from aircraft. These proposals are being considered by the International Conference at Washington.

W/T Call Signs have been reorganised and codified in conjunction with the other services and issued for the use of the Air Ministry Civil and Service stations, in order that the call signs for the whole of the United Kingdom may be on the same basis.

The whole question of the future wireless requirements of the Royal Air Force has been investigated and recommendations have been approved for the types of apparatus suitable for different purposes and types of aircraft. The design of these instruments is being considered by the Research Department of the Air Ministry.

Arrangements have been made during the last six months for the further release by the Royal Air Force for public use of :—

		Total since Armistice.
Switchboards	34	244
Tie Lines	29	253 (2,700 miles)
Exchange Lines	127	695 (2,500 ,,)
Telephones	745	4,263

Various experiments for the improvement of rocket and similar signals have been carried out, and manufacturers are still endeavouring to perfect rocket and smoke signals to meet the requirements of Civil and Service Aviation.

As a result of inter-departmental conferences held at the Admiralty, the International Signal Book has been amended and co-ordinated and will be submitted in its new form to the International Conference at Washington.

Commercial Services.

The services from Great Britain to the Continent have shown considerable expansion during the period under review, and there are now three distinct routes to the Continent, *i.e.*, from London to Paris, to Brussels and to Amsterdam. On May 1st the Aircraft Travel and Transport Company doubled its service to Paris, machines leaving the Croydon Aerodrome morning* and afternoon; and two firms, the Instone Company and the Air Post of Banks, have during the last six months established services on this route.

From July 19th Messrs. Handley Page have operated a mail service between London and Brussels, and from July 5th between London and Amsterdam,† which is the junction for air lines to Germany and the Scandinavian countries. (Further details of these services are given in the appendix.)

Arrangements have been made by the Postmaster-General with the French Post Office for letters to be forwarded by French air mail from Toulouse to Rabat and Casablanca on payment of a special air fee, and for correspondence for Egypt, India and the East, and in some weeks Australia, if posted in time for the air mail on Friday morning, to secure connection with the ordinary mail despatched from London on the previous evening.

Statistical tables are appended at the end of Part I of this Report showing for various periods the work carried out by civil aircraft (Table A), the number of British and foreign machines departing to and arriving from the Continent (Table B), the value of the goods imported and exported by air (Tables C and D), the number of letters transmitted (Table E), the percentage of efficiency secured by the air mail services (Table F), and the number of accidents sustained by machines and personnel (Table G).

It will be seen that for the period under review the machine mileage is 689,600 miles, the number of passengers carried 32,345, and the weight of goods 86½ tons, as compared to 231,600 miles, 9,808 passengers and 25¾ tons for the previous six months. The number

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* The morning service to Paris was discontinued on November 15th for the winter months.

† The mail service between London and Amsterdam was discontinued on November 1st for the winter months.

of departures and arrivals to and from the Continent has risen from 734 to 2,445 ; the value of imports from £131,615 to £376,606, and of exports from £63,743 to £168,300.

The number of letters carried since the inauguration of the Air Mail Services shows a steady increase, especially on the London Amsterdam service ; and an efficiency of 76 per cent., 94 per cent. and 84 per cent. has been obtained on the London-Paris, London-Brussels and London-Amsterdam services respectively.

There has been an increase in the number of accidents during the last six months, though the machine mileage per accident is greater.

Meteorology.

During the period under review the transfer of the Naval Meteorological Service to the Air Ministry has completed the unification of the Meteorological Services of the country. The Meteorological Office has also taken over the responsibility hitherto shared with the Scottish Meteorological Society for meteorological work in Scotland.

The Forecast Division now collects and distributes information on the following system : A general inference for the British Isles is issued twice daily by wireless telegraphy from the Air Ministry, at 0915 and 2015 G.M.T., while synoptic messages, consisting of observational data from 21 stations, are broadcasted by W/T four times daily from Aberdeen, and three times daily from the Air Ministry. The code for these synoptic messages has been modified to permit of the inclusion of information concerning humidity and visibility.

The system of special reports for the air routes between London and the Continent has been extended by the issue of hourly collective reports by W/T from Le Bourget (for stations in Northern France), from Brussels (for Belgian stations), and from Sösterberg (for Dutch coast stations and Utrecht). Stations in South-east England now measure the height of cloud when the cloud is lower than 1,000 feet. For the benefit of machines arriving in this country ground signals indicating the height of clouds and the visibility at Biggin Hill and Croydon are displayed hourly at Lympne aerodrome.

Three of the proposed new distributive stations have been opened, bringing the number of such stations up to 11. These are situated at Howden, Cranwell, Felixstowe, Lympne, Biggin Hill, Croydon, Calshot, Cattewater, Manchester, Renfrew and Baldonnell. It is the task of these stations (i) to make the necessary local observations, especially of upper wind, visibility and cloud ; (ii) to collect meteorological reports from other places in the area ; (iii) to receive by wireless telegraphy or G.P.O. telegram the collective reports necessary for the preparation of synoptic charts ; and (iv) to assist air services in the area and supply general expert meteorological information for all requirements.

They also measure upper winds by means of pilot balloons, and communicate the results, together with other meteorological information, to the Central Office, Air Ministry. The total number of pilot balloon ascents now exceeds 600 per month, of which 7 per cent. attain a height greater than 10,000 feet.

Arrangements have been made for simple observations to be made and reported by the coastguard at Beachy Head and Flamborough Head, for reports of visibility by the lightkeeper at Dungeness, and for special reports by the lightkeeper at Portland Bill.

Meteorological information for the British Isles and the air routes to the Continent is given on a large chart and a blackboard in a window of the Air Ministry.

The number of enquiries for forecasts and information on general meteorological matters has shown a steady increase. Among such have been frequent requests from farmers for direct telegraphic forecasts.

The normal work of the observatories at Richmond (Kew), Eskdalemuir, Benson, Valencia and South Farnborough has continued without interruption. Arrangements are being made for the establishment of a geophysical observatory in Shetland which, in addition to the usual meteorological work, will carry out research into aurora, magnetism and earth currents, and will work in conjunction with Amundsen's polar drift.

Four pilots lent by the Royal Air Force to assist in upper air investigations have conducted daily observations of temperature and humidity.

Courses of instruction are given under the supervision of the Director of the Meteorological Office to the officers of the School of Aerial Navigation at Calshot, to the cadets of the Royal Air Force Cadet College at Cranwell, and to American airship personnel at Howden.

Representatives from the Meteorological Office attended a conference with Scandinavian meteorologists at Bergen in July in order to study the special methods of forecasting recently introduced in the Norwegian Geophysical Institute.

An important publication on the climatology of the British Isles, entitled "The Book of Normals of Meteorological Elements for the British Isles for the period ending 1915," and a number of papers dealing with weather forecasting and upper air investigations have been issued.

Licences and Certificates.

The following licences and certificates have been granted during the period under review :—

	New.		Renewals.	
	April 1 to September 30, 1920.	Total since May 1, 1919.	April 1 to September 30, 1920.	Total since May 1, 1919.
Licences for Pilots	95	579	129	258
,, Ground Engineers	133	478	90	90
,, Engineers	—	1	—	—
,, Navigators	2	6	—	—
,, Aerodromes	87	206	6*	6*
Certificates of Registration (Aircraft)	113	587	150	150
,, ,, (Balloons)	5	5	—	—
,, Airworthiness	95	420	53	53

* In many cases aerodrome licences are issued for periods of only a few weeks. Thus the 12 aerodrome licences shown in the last half-yearly report as renewals were extensions of licences which had been issued in the first place for periods of less than 12 months. The number of renewals now shown are those of 12 month certificates for a further 12 months.

Detailed regulations governing the issue of certificates to aerial navigators and pilots (Class B, *i.e.*, pilots flying passenger or goods aircraft) have been drawn up and arrangements made for the technical examination in navigation of civilian pilots. In accordance with these regulations the navigation tests, the strict enforcement of which has up to the present been relaxed in the case of qualified ex-Royal Air Force pilots, will in future be imposed.

Medical Services.

The arrangements to simplify the procedure for the attendance of aircraft crews for medical examination, which have now been in operation for some months, have proved of convenience to pilots and navigators.

With a view to rendering medical examination as free as possible from individual opinion investigations are proceeding from which it is hoped to evolve methods in the direction of exact measurement and record in addition to those already forming part of the examination. Progress in this direction will also materially assist decentralisation in the granting of licences.

It is hoped shortly to arrange for the medical re-examination of British pilots flying continuously in foreign countries to be carried out at suitable centres by selected resident medical practitioners, who will be empowered to accept, defer or reject applicants for renewal of licences, their decisions being subject to confirmation by the Air Ministry. This will enable pilots to maintain their British licences under conditions within the control of the Air Ministry.

It is now possible to begin to judge the effect of continuous civil flying on those engaged in the regular Continental services, or on other continuous air work, such as photography and survey; and a detailed statistical analysis of the physical condition of pilots is in course of preparation. It is interesting to note that the physical condition of the pilot employed on continuous air work compares favourably with that of the selected University athlete, or of the candidate for a commission in the Royal Air Force.

The results of the medical re-examination of pilots, enforced by the Air Navigation Regulations, also denote a high standard of physical efficiency. In support of this are the following figures for the six months from March 30th to September 30th :—

Pilots accepted after re-examination	98·04 per cent.
Pilots temporarily deferred as a result of sickness after re-examination	1·31 ,,
Pilots rejected after re-examination	·65 ,,

Standard schedules of medical stores for Government-owned civil aerodromes have been prepared, and regulations have been drawn up for the training and certification in first aid of one or more traffic hands, the standard being the certificate of the Society of St. John of Jerusalem, Ambulance Section.

At Croydon and Lympne arrangements have been made for the attendance in case of emergency of selected local medical practitioners.

Collection, Collation and Issue of Information.

The methods outlined in the last report for obtaining and disseminating information concerning the development of civil aviation and opportunities for its exploitation abroad have not been substantially modified.

With the expansion of civil aviation it has become necessary to ensure that all pilots have opportunities of acquainting themselves with the " Notices to Airman " which contain information issued by the Air Ministry regarding aerial navigation, wireless telegraphy, landing grounds, customs stations, prohibited areas, etc. Arrangements have accordingly been made for exhibiting these notices at terminal and customs aerodromes at home, and for their circulation to the technical and daily press, aircraft firms, licencees of private aerodromes, and aeronautical associations. Arrangements are also being made for their circulation abroad, while similar notices issued by foreign governments will be communicated to the Air Ministry for the guidance of British airmen flying abroad.

With a view to acquainting ground engineers with technical information affecting the daily maintenance of the airworthiness of aircraft obtained from investigation into accidents, or from experience gained by the inspecting staff of the Air Ministry, a series of " Notices to Ground Engineers " has been instituted. These are distributed to all owners of aircraft, to the aeronautical press and to such public bodies as are interested.

At the request of the Joint Exhibition Committee of the International Aeronautical Exhibition held in London at Olympia between July 9th and 20th, an exhibit was arranged by the Air Ministry to illustrate the assistance rendered by the State to private enterprise in the organisation of air routes and aerodromes, the improvement of wireless and other means of communication, the development of safety devices, aeronautical research, and the operation of the meteorological service.

During the period under review the following have been issued : 82 Special Notices to the Society of British Aircraft Constructors ; 6 Commercial Resumés ; 6 Technical Memoranda ; 3 Confidential Technical Memoranda ; 6 Technical Abstracts ; 103 Official Communiqués (*i.e.*, official notices to the public through the Press) ; 67 Notices to Airmen ; and 11 Notices to Ground Engineers.

Research.

The Department of Research has considered the development of several new types of power plant, including the swash-plate engine, the differential rotary engine, the direct injection type of engine and the steam turbine, which involves the production of a sufficiently light condenser.

The two latter plants if successful will enable a fuel of higher flash point to be used, thus making for safety and cheapness.

Experiments are being carried out on the engine problems connected with flight at high altitudes, viz., forced induction, super-dimensioned or super-compression engines, and variable pitch propellers.

Several new designs of aircraft are being produced with facilities for making adjustments to the engines during flight. A satisfactory engine starter for use on the ground is now available, and the problem of mounting a starter as an integral part of the machine is receiving attention.

The improvement of the lift coefficient of aerofoils without adversely affecting the lift/drag ratio or unduly increasing weight is being studied.

The problem of rendering magnetos fireproof is under investigation at the National Physical Laboratory and the Royal Aircraft Establishment.

The principal hindrance to air navigation is mist and fog, to minimise the effects of which research is being made into the mechanical dispersal of fog, the illumination of landing grounds, mechanical apparatus to cause machines to flatten out automatically just before touching the ground, and instruments for indicating accurately to the pilot his position in relation to the aerodrome and his height above the ground.

Numerous factors affecting the operation of airships have been investigated, including the durability of gas-tight and outer cover fabrics in dry climates (Egypt),

the development of a standard power unit interchangeable from one ship to another, and the recovery of water from the exhaust. An improved mooring mast is being erected under the supervision of the department in order to carry out further tests in mooring airships.

Among other problems under consideration are those connected with the all-metal machine, the helicopter, the amphibian, and various instruments for night flying.

Airships.

It is hoped that surplus airships will ultimately be handed over on approved terms to a private company to operate. Meanwhile the Department of Civil Aviation has agreed temporarily to take over all airships, bases and material, surplus to Service requirements, in order to carry out experimental work of an operational character, such as mooring mast tests and flights of primary importance, to gauge the ships' capacity for commercial operation. The results of these experiments and the knowledge and experience obtained will be available to any company eventually taking over the airships.

Insurance.

The policy of assisting insurance companies to establish aviation insurance has been continued; and in addition to providing information respecting the certification of aircraft, the licensing of pilots and aerodromes, and the standards applied in the official medical and technical examinations, the means has been afforded of obtaining subsequent information concerning pilots, engines and aircraft by the introduction of log books, compiled in consultation with the representatives of the aircraft industry. These are now available to the public.

The only fixed rates of insurance so far quoted are those for passenger risks, but Lloyds have issued a Civil Aircraft Record, the first publication of its kind that has appeared in any country.

Expenditure.

It will be of interest briefly to state the position as to expenditure by the Department of Civil Aviation for the first half of the financial year 1920/21. The estimates were drawn up in September, 1919, when the measure of progress to be expected during the following year was still hypothetical, and the compilation of precise estimates consequently impossible. It was, therefore, adopted as a guiding principle that, within the prescribed limits, expenditure should be estimated on a sufficiently elastic basis to permit the extension of general ground organisation both in this country and on the cross-Channel and Imperial air routes, should the development of civil aviation warrant it. Expansion, however, has been principally confined to the air services to the Continent; no internal services have materialised; and the disturbances in Mesopotamia and the Near and Middle East have postponed the opening up of the Cairo-Karachi air route as originally provided for.

If the main items of the estimates are considered in the light of these facts, it will be seen that a considerable saving in expenditure is inevitable. The sum of £80,000, provided in the estimates for the purchase of buildings and lands for Government-owned aerodromes in Great Britain, has been reduced to £45,000, as only the aerodromes at Croydon and Lympne on the air routes to the Continent are in operation. Of the £172,000 provided for the erection of buildings and the preparation of landing grounds on the Imperial air routes, only a small expenditure on an aerodrome in Malta is anticipated. Other items are susceptible to reduction and the total anticipated expenditure under the head of Works, Buildings and Lands is £148,000, compared to the estimated expenditure of £415,000.

The estimates provided also for personnel at the proposed aerodromes and an annual wage-bill of £80,000 for Civil Aviation Transport Officers of different grades, storemen, labourers, etc., but since the needs of the civil air services are as yet limited to the use of the aerodromes at Croydon and Lympne, a large reduction in the anticipated expenditure under this head has been effected.

Owing to the difficulty of estimating the expenditure on the Imperial air routes, a reduction of approximately £50,000 under the head of Stores and Transport and of £90,000 under the head of Technical Equipment, is anticipated.

It will be remembered that the budget provided for the expenditure of £1,000,000 in aid of civil aviation during the present financial year. Every possible effort is being made to exercise legitimate economy on items under the prescribed heads, and the total anticipated saving on the estimates amounts to about £400,000. Satisfactory as this result may appear from the point of view of economy, it is regrettable that the Department has no means of utilising its funds for purposes necessary to the development of air transport services but outside the scope of the items provided for in the estimates.

Imperial Air Routes.

(i) *England—Egypt.*—Authority has been given for increasing the power of the Royal Air Force wireless stations in London, Malta and Cairo, and when this is done the communications along the air route between England, Malta, Egypt, Mesopotamia and India will be assured.

The naval and military authorities in Malta have concurred in the selection of the site for the proposed aerodrome.

(ii) *Egypt—India.*—There is now a complete chain of wireless stations about 300 miles apart between Cairo and Karachi. Otherwise the preparation of this route has been delayed owing to the unsettled conditions prevailing in Mesopotamia and Persia.

(iii) *Cairo—Cape Town.*—The financial responsibility for the reconnaissance, preparation and, up to the present time, the maintenance of the aerodromes on this route has been borne by the British Government. It is felt, however, that while the considerable labour expended on the preparation of the aerodromes must not be wasted by allowing them to fall into disuse, the Imperial Government cannot continue to bear the cost of upkeep of the route as a whole. Negotiations have therefore taken place with a view to handing over the aerodromes along each section of the route to the local Governments concerned which have agreed to be responsible for their maintenance; and, except in the case of Northern Rhodesia, arrangements to this end are near completion. Certain financial details, however, still await settlement with the Government of the Anglo-Egyptian Sudan, which will provide for the future upkeep of the aerodromes from Wadi Halfa to Mongalla, the Egyptian Government being responsible for those from Cairo to Wadi Halfa. The Treasury has agreed to the proposals for Uganda, Kenya Colony (British East Africa) and the Tanganyika Territory to take over the aerodromes situated within their boundaries, and, thanks to the representations made by the British South Africa Company, the Municipality of Buluwayo has expressed its willingness to maintain the aerodrome at that town. If it is decided to retain the aerodome at Palapye, this will be maintained by the Bechuanaland Protectorate.

Instructions have been issued in accordance with the suggestions made by the Colonial Office for these aerodromes to be handed over to the Governments concerned as from October 1st.

The Government of the Union of South Africa is prepared to take over the aerodromes in that Dominion provided that the Imperial Treasury is willing to forego the expenditure on construction, etc., already incurred.

THE DOMINIONS, INDIA AND THE COLONIES.

Australia.—The Prime Ministers of the Australian States have agreed that legislation arising from the obligations of the International Air Convention should be referred to the Federal Parliament, but with a reservation to the effect that each State shall retain the right to own and/or use for Governmental purposes State aircraft operating within the State. The Law Officer has accordingly been invited to draft a Federal Bill on the lines of British legislation with such adaptations and additions as are necessary for Australian conditions.

Several routes have been surveyed, and various schemes, such as the organisation of an air service between Melbourne, Adelaide, Sydney and Hobart have been considered.

Canada.—The Government civil aerodrome at Ottawa is now open, and the seaplane station at Vancouver is nearing completion. All regular Government air stations are to be licensed and will be available as commercial stations. The Superintendent of Flying Operations has decided to dispose of 10 Bessonneau hangars to cities, municipalities, air leagues, etc., to encourage and assist the establishment of public air harbours.

A preliminary survey of the proposed air route between Winnipeg and Sudbury (Ontario) and a photographic survey of the country in the vicinity of Lake St. John, in Northern Quebec, have been carried out.

A conference attended by representatives of the Canadian Air Board, the Associate Air Research Committee, and the Meteorological Department has been held to discuss the meteorological situation, and it is understood that pilot balloons and observation stations for studying atmospheric conditions in the upper air will be maintained at each base from which the Air Board proposes to carry out flying operations.

A scheme for the manufacture of new types of machine has been considered and skeleton specifications, drawn up for single-engined flying boats, aeroplanes and seaplanes, have been approved by the Air Board. Manufacturers will submit preliminary drawings to the Board, which will then decide upon and place orders for trial machines.

The Associate Research Committee has decided to concentrate attention on the action of engines at extreme low temperatures and the problems connected with carburation, oiling and cooling.

The following table shows the number of certificates and licences applied for by, and issued to, personnel, aircraft and air harbours, up to October 2nd, 1920. An important feature of the scheme is that any person taking out a civilian certificate agrees to become a member of the Canadian Air Militia and will be required to undergo a course of instruction for at least one month every two years.

Type of certificate or licence.	Applications.			* Temporary certificates.						. Permanent certificates.					
	Received.	Refused.	In abeyance.	Total issued.	Suspended.	Re-instated.	Suspensions still in force.	Cancelled.	Issued and still in force.	Total issued.	Suspended.	Re-instated.	Suspensions still in force.	Cancelled.	Issued and still in force.
Private Air Pilot's Certificates	57	Nil	8	2	Nil	Nil	Nil	Nil	2	47	Nil	Nil	Nil	Nil	47
Commercial Air Pilot's Certificates	91	,,	24	67	1	,,	1	4	16	46	,,	,,	,,	,,	46
Air Engineer's Certificates ...	59	,,	4	55	Nil	,,	Nil	1	26	28	,,	,,	,,	,,	28
Air Navigator's Certificates ...	2	,,	2	Nil	,,	,,	,,	Nil	Nil	Nil	,,	,,	,,	,,	Nil
Certificates of Registration of Aircraft	112	1	25	71	,,	,,	,,	,,	27	59	,,	,,	,,	,,	59
Airharbour Licences	43	3	4	36	,,	,,	,,	,,	28	8	,,	,,	,,	,,	8
Totals	364	4	67	231	1	Nil	1	5	99	188	Nil	Nil	Nil	Nil	188

* Granted temporarily, pending issue of Permanent Certificates, when they automatically lapse.

A scheme has been submitted to the Privy Council by the Air Board for the insurance of civil flying personnel.

A vote of $2,300,000 for aviation has been passed by Parliament.

India.—The Air Board has decided upon the provision of aerodromes on the Calcutta-Delhi-Bombay, Bombay-Karachi and Calcutta-Rangoon routes.

The import duty payable on aircraft, aircraft engines and accessories has been reduced from 17½ per cent. to 2½ per cent. *ad valorem.*

Newfoundland.—It is understood that a private company has purchased a British aeroplane of the latest type and four small non-rigid airships for work in connection with the fishing industry.

New Zealand.—An Air Board has been formed, consisting of nine members, including representatives of the Departments of Land and Survey, Public Works, and the Post Office. Its functions are to consider and advise on all questions connected with aviation, to maintain touch with the British Air Ministry, and to keep pace with modern developments throughout the world.

By arrangement with the Department of Posts and Telegraphs, contracts were entered into by the Flying School at Auckland for the carriage of mails in the vicinity of the town, but the present shortage of petrol has interfered with the project.

South Africa.—Enterprise is displayed by a number of private individuals, and it is hoped that substantial progress will be made upon the arrival of the Director of Air Services in the Dominion, when it is understood that the Government will make a pronouncement on their policy in regard to civil aviation, particularly as affecting air mails and the organisation of an Air Defence Force.

West Indies and Bermuda.—The Bermuda and West Atlantic Aviation Company was floated in June, and a Bill passed by the local legislature of Bermuda granting certain concessions and enabling the company to commence operations on a small scale.

This company is also interested in projects for the operation of air services between the West Indian Islands.

TABLE A.—BRITISH CIVIL AVIATION (INCLUDING CONTINENTAL SERVICES).

May 1st, 1919—September 30th, 1920, inclusive.

—	May to September, 1919. (5 months.)	October, 1919, to March, 1920. (6 months.)	1920.						April to September, 1920. (6 months.)	May, 1919, to September, 1920. (17 months.)
			April.	May.	June.	July.	August.	September.		
Number of machine flights	31,250	6,571	1,133	2,210	3,763	3,399	6,165	3,988	20,658	58,479
Number of machine hours flown	6,566	3,061	511	847	1,460	1,820	1,985	1,577	8,200	17,827
Average duration of each flight (minutes) ...	12	28	27	23	23	33	19	24	24	18
Approximate machine mileage	460,300	231,600	42,400	76,000	128,500	143,700	164,000	135,000	689,600	1,381,500
Number of passengers carried	58,132	9,808	1,983	2,870	4,766	5,005	10,372	7,349	32,345	100,285
Weight of goods carried in tons	20¼	25¾	6	7¾	13	14¼	22¼	23¼	86½	132½

TABLE B.—DEPARTURE AND ARRIVAL OF AIRCRAFT TO AND FROM THE CONTINENT.

August, 1919, *to September*, 1920, *inclusive.*

	Aug. 26th–Sept. 30th, 1919.		Oct. 1919–Mar. 1920. (6 months.)		April.		May.		June.		July.		August.		September.		April to Sept. 1920. (6 months.)		TOTAL. Aug. 26th, 1919–Sept. 30th, 1920. (17 months.)	
	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.
British	77	72	324	281	63	67	124	113	183	177	217	198	234	214	209	198	1,030	967	1,431	1,320
French	6	7	60	60	26	28	44	42	35	39	30	32	35	31	33	33	203	205	269	272
Belgian	—	—	3	4	—	1	2	1	—	—	1	1	1	2	16	13	20	18	23	22
Swiss	—	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1
Other States ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	1	1	1	1
Total	83	79	388	346	89	96	170	156	218	216	248	231	270	247	259	242	1,254	1,191	1,725	1,616
	162		734														2,445		3,341	

Table C.—Value of Goods Imported into the United Kingdom by Aircraft.

August, 1919, *to September*, 1920, *inclusive.*

Period.	Imports (free) from—					Imports (dutiable) from—					Total imports.
	Belgium.	France.	Germany.	Netherlands.	Total free.	Belgium.	France.	Italy.	Netherlands.	Total dutiable.	
	£	£	£	£	£	£	£	£	£	£	£
April, 1920...	—	29,350	850	—	30,200	—	1,967	4,000	—	5,967	36,167
May, 1920	—	74,978	—	24	75,002	—	862	82	—	944	75,946
June, 1920	—	68,723	—	1,000	69,723	—	5,734	4,000	13	9,747	79,470
July, 1920	91	47,797	—	420	48,308	2	3,667	—	29	3,698	52,006
August, 1920	—	54,304	—	212	54,516	379	1,845	200	—	2,424	56,940
September, 1920	138	73,571	—	237	73,946	17	2,105	—	9	2,131	76,077
Total—April to September, 1920 ...	229	348,723	850	1,893	351,695	398	16,180	8,282	51	24,911	376,606
Total—October, 1919, to March, 1920 ...	384	123,193	—	470	124,047	7	7,554	6	1	7,568	131,615
Total—August to September, 1919 ...	—	4,425	—	—	4,425	—	76	—	—	76	4,501
Total—August, 1919, to September, 1920	613	476,341	850	2,363	480,167	405	23,810	8,288	52	32,555	512,722

Table D.—Value of Goods Exported from the United Kingdom by Aircraft.

August, 1919—*September*, 1920, *inclusive.*

Period.	British Exports to—								Re-exports to—				Total Exports and Re-exports.
	Belgium.	France.	Germany.	Italy.	Netherlands.	Denmark.	Spain.	Total Exports (British).	Belgium.	France.	Netherlands.	Total Re-exports.	
	£	£	£	£	£	£	£	£	£	£	£	£	£
April, 1920	—	4,522	—	—	—	—	—	4,522	—	8,393	—	8,393	12,915
May, 1920	—	8,882	—	—	923	—	50	9,855	—	14,136	30	14,166	24,021
June, 1920	—	7,438	—	—	1,662	—	—	9,100	113	14,110	823	15,046	24,146
July, 1920	87	6,844	—	—	3,133	—	—	10,064	—	10,266	4,644	14,910	24,974
August, 1920	11,988	7,960	—	—	5,482	2,850	—	28,280	44	13,785	1,764	15,593	43,873
September, 1920	3,886	10,877	9	—	7,220	313	—	22,305	5	12,475	3,586	16,066	38,371
Total—April to September, 1920	15,961	46,523	9	—	18,420	3,163	50	84,126	162	73,165	10,847	84,174	168,300
Total—October, 1919, to March, 1920	9,583	29,271	—	1	—	—	—	38,855	—	24,888	—	24,888	63,743
Total—August to September, 1919	—	2,158	—	—	—	—	—	2,158	—	844	—	844	3,002
Total—August, 1919, to September, 1920...	25,544	77,952	9	1	18,420	3,163	50	125,139	162	98,897	10,847	109,906	235,045

Table E.—Number of Letters Transmitted by Air Mail.

November, 1919, to September, 1920, inclusive.

Month.	Number of letters posted for			Total.	Number of letters posted from			Total.
	Paris.	Brussels.	Amsterdam.		Paris.	Brussels.	Amsterdam.	
November (from 10th)	1,020	—	—	1,020	734*	—	—	734*
December	826	—	—	826	890*	—	—	890*
January	889	—	—	889	979*	—	—	979*
February	1,018	—	—	1,018	911*	—	—	911*
March	1,607	—	—	1,607	1,225	—	—	1,225
Total—November, 1919, to March, 1920	5,360	—	—	5,360	4,739*	—	—	4,739*
April, 1920	971	—	—	971	1,010	—	—	1,010
May, 1920	1,923	—	—	1,923	1,359	—	—	1,359
June, 1920	2,141	—	—	2,141	1,592	—	—	1,592
July, 1920	2,951	1,026	2,930	6,907	1,568*	648	7,425	9,641*
August, 1920	6,165	2,262	4,436	12,863	1,252*	1,552	7,750	10,554*
September, 1920	7,700	5,470	8,200	21,370	1,882	2,010	12,290†	16,182
Total—April to September, 1920 ...	21,851	8,758	15,566	46,175	8,863*	4,210	27,465†	40,338*†
Total—November, 1919, to September, 1920	27,211	8,758	15,566	51,535	13,602*	4,210	27,465†	45,077*†

* Partly estimated.

† Includes letters from Germany, Denmark, and Sweden *via* Holland.

Table F.—Efficiency of Outward Aerial Mail Services.

Class A.—Flights completed to aerodrome abroad without delay of more than three hours.
Class B.—Flights completed same day but with delay of more than three hours.
Class C.—Flights completed only next day, not completed or abandoned, including failures in terminal service (London).

Month.	Route.														
	London—Paris.					London—Brussels.					London—Amsterdam.				
	Number of flights.				Percentage of Class A flights to total flights.	Number of flights.				Percentage of Class A flights to total flights.	Number of flights.				Percentage of Class A flights to total flights.
	Class A.	Class B.	Class C.	Total.		Class A.	Class B.	Class C.	Total.		Class A.	Class B.	Class C.	Total.	
November, 1919	8	— *	10	18	44	—	—	—	—	—	—	—	—	—	—
December, 1919	9	— *	15†	24	38	—	—	—	—	—	—	—	—	—	—
January, 1920	13	1	13†	27	48	—	—	—	—	—	—	—	—	—	—
February, 1920	15	—	9	24	62	—	—	—	—	—	—	—	—	—	—
March, 1920	24	—	3	27	89	—	—	—	—	—	—	—	—	—	—
April, 1920	20	2	1	23	87	—	—	—	—	—	—	—	—	—	—
May, 1920	34	3	3	40	85	—	—	—	—	—	—	—	—	—	—
June, 1920	50	1	1	52	96	—	—	—	—	—	—	—	—	—	—
July, 1920	40	3	11	54	74	9	—	3	12	75	20	1	3	24	83
August, 1920	41	3	6‡	50	82	25	—	—	25	100	23	2	—	25	92
September, 1920	44	3	5	52	85	25	—	1	26	96	20	—	6	26	77
Totals	298	16	77	391	76	59	—	4	63	94	63	3	9	75	84

* Included in Class C

† Includes 10 failures in terminal services.

‡ Includes 1 failure in terminal service.

TABLE G.—ACCIDENTS.

May, 1919, *to September*, 1920, *inclusive.*

—	May to Sept., 1919 (5 months).	October, 1919, to March, 1920 (6 months).	April to Sept., 1920 (6 months).	May, 1919, to Sept., 1920 (17 months).
Flying accidents resulting in death to one or more occupants of machine...	2	2	3	7
Non-fatal flying accidents resulting in injury to occupants of machine	8	3	6	17
Flying accidents resulting in death of third party ...	1	—	—	1
Flying accidents resulting in injury of third party (propeller accident)	—	—	1	1
Flying accidents not involving injury to personnel...	2	6	11	19
Total accidents reported	13	11	21	45
Casualties to personnel—				
Pilots killed	2	2	3	7
Pilots injured	6	3	4	13
Passengers killed	—	1	7	8
Passengers injured	10	2	3	15
Third party killed	1	—	—	1
Third party injured	—	—	1	1
Accident and casualty rates—				
Machine miles per flying accident	35,400	21,000	34,400	31,400
Machine flights per flying accident	2,404	597	1,033	1,329
Machine hours per flying accident...	505	278	410	405
Passengers killed per 1,000 carried	—	0·10	0·22	0·08
Passengers injured per 1,000 carried	0·17	0·20	0·10	0·15

PART II.—FOREIGN COUNTRIES.

General Remarks.

The period under review has witnessed a general expansion in commercial air traffic and the operation of regular and experimental air services in a number of foreign countries, including Germany.

In South America and the Far East no material progress has been made, but British and foreign interests are still endeavouring to develop the operation of air services on a remunerative basis.

EUROPE.

Austria.

The effects of the Peace Treaty, combined with the economic situation, continue to retard development. The Inter-Allied Aeronautical Commission of Control has now taken possession of Austrian naval and military aeronautical material in accordance with the terms of the Treaty.

With a view to constituting Vienna a large station for international air navigation, the mayor has held a conference with members of the Inter-Allied Commission of Control, at which provisional arrangements were made for the appointment of a Commission containing nominees from the Allied countries, representatives of the corporation and local aeronautical firms.

The State Air Department has appealed to municipalities to construct aerodromes and landing places in the national interest, and the aerodrome at Aspern has been nominated as an international air port.

A private company, known as the Luftverkehrsgesellschaft (Air Transport Company), associated with the Luftfahrwesen Gesellschaft ("Lufag"), which was formed, as mentioned in the last half-yearly report, for the disposal of Austrian Service aeronautical material, is studying the question of inaugurating air transport services and is endeavouring to secure co-operation with foreign companies in order to form a combination capable of undertaking international traffic.

Belgium.

A total sum of 9,945,000 francs has been voted for civil aviation in the air estimates for 1920, of which 6,000,000 francs is for the organisation of routes and 1,000,000 francs for exploitation and subsidies.

The general development of civil aviation has proceeded steadily. Belgium was handicapped as compared with other nations engaged in the war by the lack of an established aeronautical industry, but advantage has since been gained by the centralisation of effort in the National Syndicate for the Study of Aerial Transport. The Syndicate, in conjunction with Messrs. Handley Page, Ltd., opened on June 19th a daily air mail and passenger service between London and Brussels, and has maintained a regular service between Brussels and Paris conjointly with French companies.

On the Brussels-London service 130 journeys were carried out between July 19th and September 30th, and 187 passengers, 2,205 lbs. of goods and 743 lbs. of letters were transported without accident. On the Brussels-Paris route, during the sixty-three working days following July 19th, 217 journeys were effected, and 164 passengers, 1,488 lbs. of goods and 209 lbs. of letters were carried.

The Syndicate's plans include services from Brussels to Amsterdam, Strassburg and Cologne, in addition to those from Brussels to London and Paris.

In the Belgian Congo, the Syndicate is promoting, with the assistance of the Belgian Government, a service called the "Ligne Aerienne Roi Albert" between Kinshasha and Stanleyville, a distance of about 1,125 miles, and the first section from Kinshasha to Gombe is said to have been opened on March 1st. Four seaplanes are used on this service for the carriage of mails, merchandise and passengers. It is estimated that the full journey will take only three days as compared with the present 17 days' journey by river.

The methods adopted by the Syndicate are illustrated by the steps it has taken to obtain advice and support from the whole business community of Belgium.

In order to afford the general public experience of flying, propaganda units (" Escadrilles de Vulgarisation "), which provide passenger trips at reasonable cost, have been based at a number of places, including Brussels, Antwerp and Spa.

Haren (Brussels) has been equipped and opened as an international customs aerodrome, and a seaplane station with berthing facilities is to be provided at Ostend, which will become the port of entry for seaplanes from England.

An event of importance in Belgian aviation during the period under review was the aeronautical meeting in connection with the Olympic Games, held at Antwerp in July and August. The Governments of France and Italy sent Service aircraft units to take part in the competitions for military machines, while two British flying boats, representing private enterprise, competed with success.

France.

The policy of the French Government in regard to civil aviation is developing upon the lines adumbrated in the last report. A sum of 128,794,770 francs has been voted for the Department of the Under Secretary of State for Air, which, as formerly, is under the Ministry of Public Works.

A new Bill for the regulation of civil aviation has been introduced, but has yet to pass the Senate. Pending its passage into law a temporary decree laying down provisional rules was signed by the President of the Republic on July 8th. On August 26th regulations were published dealing with administrative measures, such as the licensing of personnel, registration and inspection of aircraft, and other details affecting civil aviation.

As a consequence of the subsidies granted to air transport companies carrying out regular services, a considerable number of routes have been organised and are working regularly. Simultaneously, new air transport companies have sprung into existence and the older concerns have concentrated their efforts by amalgamation. The following routes are now in operation: Paris—London, Paris—Brussels, *Paris—Strassburg, Bordeaux—Toulouse—Nice, Toulouse—Barcelona—Malaga—Rabat—Casablanca, and Bayonne—San Sebastian—Bilbao (*see* Appendix). The extension of the Bayonne—Bilbao line to Bordeaux and Gijon is expected.

These developments have not yet been attended by the evolution of new types of commercial aircraft. In June, the French Under Secretary of State for Air stated that 152 aeroplanes and 23 seaplanes had been put into use for commercial purposes, and that the construction of two rigid airships was contemplated.

Seaplanes and flying-boats proceeding from England to France must land for Customs inspection at one of the following ports: Dunkirk, Calais, Boulogne, Le Treport, Dieppe, Havre, Caen, Cherbourg, St. Malo, where the same regulations are enforced as for ships.

Customs examination in France for air traffic with Switzerland will be carried out at the following aerodromes and seaplane stations:—

Route.	Customs Station.
Aeroplanes.	
Geneva—Lausanne—Lyons	Amberien.
Lausanne—Paris	Dijon (Frontier Station to be established at Pontarlier).
Switzerland—Alsace-Lorraine ..	Mulhouse.
Seaplanes.	
Switzerland—Upper Savoy	Thoron or Evian.
Switzerland—Interior of France ..	Annecy.

A Consortium has been formed by a number of insurance companies, and insurance against aviation risks, for which a detailed scheme has been drawn up, is being made compulsory by the State.

Germany.

In spite of the restrictions imposed by the Peace Treaty and the petrol shortage, civil aviation in Germany has progressed since the date of the last report; air transport services have been opened, and German aircraft manufacturers have displayed considerable interest in the future possibilities of foreign markets. The following types of machines have been passed as " civil " by the Inter-Allied Commission of Control, but so far permission has not been given for their manufacture, and they exist only in

* This service was extended to Prague on October 4th.

type : Fokker (Limousine), 180 h.p. ; Junker (Limousine), 185 h.p. ; Sablatnig monoplane, 125 h.p. ; Sablatnig (Limousine) biplane, 220 h.p. ; Sablatnig (Limousine) monoplane, 120 h.p. : L.F.G. Stralsund seaplane, 160 h.p. With the object of assisting the Luftministerium in its work and promoting the general development of the aviation industry, a number of air transport and aircraft manufacturing companies have formed an association called the " Flug und Hafen " (Aviation and Airports), which is officially recognised by the Government. The Association has apparently assumed responsibility for the control of aerodromes, sheds, meteorological stations, signals, etc.

On August 3rd the Deutsche Luftrederei, in conjunction with Danish, Swedish, and Dutch air transport companies, started tri-weekly air services from Copenhagen and Malmö (Sweden) to Warnemünde (by seaplane) and from Warnemünde to Berlin and Hamburg, while the Sablatnig Company operated a service from Berlin to Bremen, where it connected with the Deutsche Luftrederei service, and Amsterdam. Upon the inauguration on September 15th of a daily service between Copenhagen and Hamburg by the Danish Air Transport Company, the connection between Hamburg and Warnemünde was discontinued, and the other German services came into daily operation.*

The carriage of mails by air was commenced between Germany and Sweden on August 12th, between Germany and Holland on September 1st, and between Denmark, Sweden and Holland on September 15th.

Temporary Air Services were operated during the Frankfurt Fair between Frankfurt and Munich, Berlin, Leipzig and Bremen.

It is of interest that the leading German air transport companies have associated themselves with important shipping companies which act as traffic agents. The Deutsche Luftrederei and the Deutsche Luftschiffahrt Gesellschaft (Delag) which operated the Zeppelin airships " Bodensee " and " Nordstern " are thus associated with the Hamburg-Amerika Line and the Sablatnig Company and other minor concerns with the Norddeutsche Lloyd.

There are many smaller transport companies which have published plans for proposed air services, but as yet none has established a regular line except on a temporary and experimental basis.

The Deutsche Luftrederei and the Sablatnig Company are understood to be receiving subsidies from the Government conditional on regular services being maintained, the amount of the subsidy placed at the disposal of the Deutsche Luftrederei being reported at 15½ million marks. A sum of 60,000 marks is also said to have been granted to the Gottingen Aero-dynamic Research Laboratory.

An announcement in the Press on the results of the first six months of civil aviation states that out of 1,532 flights, 1,430 or 93·3 per cent. were successful, 347,595 miles were flown, and 1,574 passengers, 46,223 lbs. of mails, 125,864 lbs. of newspapers and 11,241 lbs. of parcels were carried.

Arrangements have been made for the retention by Germany of a limited number of aerodromes, seaplane and airship stations, together with a certain amount of material for the use of international civil aviation.

Representatives of German aircraft companies have appeared in the United States and the Central and South American Republics in order to investigate opportunities for future exploitation. Experiments have been carried out in the United States with the Junker all-metal aeroplane, and, following a visit to America by directors of the Zeppelin constructing and operating companies, a number of American financiers are, according to reports in the American and German press, negotiating with the Zeppelin interests with a view to the inauguration of an airship service between Europe and America.

HOLLAND.

By contract with the Dutch Government the Koninklijke Luchtvaart-maatschappij is responsible for the Amsterdam-London air mail service, which it operates in conjunction with the Aircraft Transport and Travel Company and Messrs. Handley Page.† This service connects with the German service to Berlin and the German and Danish services to Bremen, Hamburg, Copenhagen and Malmö (*vide* under Germany).

The air stations at Schiphol and Schellingwoude (both near Amsterdam) have been appointed as Customs stations for aeroplanes and seaplanes respectively. A new civil

* The Copenhagen-Hamburg-Amsterdam and the Berlin-Warnemünde-Copenhagen services were suspended on October 31st for the winter.

† This service was discontinued on November 1st for the winter months.

aerodrome has recently been opened at Rotterdam, and machines flying on the Amsterdam-London route stop here to pick up mails and passengers.

The municipal authorities of several commercial towns have shown their appreciation of Holland's central position for international air traffic by drawing up plans for local aerodromes and in some cases voting money for their construction.

According to regulations issued during August by the Ministries of War and Marine, all civil aircraft may use certain naval and military air stations and be provided with petrol and other facilities on payment of appropriate fees.

During July a technical mission, representing the Dutch National Committee for Aeronautical Research, visited England in order to study latest developments.

Italy.

No money has been voted for civil aviation, and as long as the present financial stringency prevails in Italy, it is unlikely that the Government will pay serious attention to commercial or air mail services.

The demonstration flight from Rome to Tokio has been accomplished by two machines. The journey which commenced on February 14th was completed on May 31st.

A demonstration flight from Italy to Stockholm *via* the Swiss lakes and the Rhine has been carried out by flying boats under the auspices of an Italian seaplane construction firm.

Portugal.

An aerial transport company has now been registered in Macao (Portuguese territory) as a Portuguese concern, and the Government of Macao has promised the grant of a subsidy in return for certain undertakings to be carried out by the company.

Rumania.

A law for the creation and exploitation of air routes, published on September 14th, empowers the State to open up air navigation for its own or the public use, and, according to a Royal Decree of October 13th, a Directorate of Aviation has been formed under the Ministry of Communications for the administration of air lines.

Scandinavian States.

The proposal to conclude a Convention common to all the Scandinavian States, under the title of the Northern Aerial Convention, has been abandoned, but negotiations are being carried on between individual States for the conclusion of separate agreements.

The activities of each State may be summarised as follows :—

(i) *Denmark.*—The Danish regulations for air navigation were published on September 11th. Since September 15th the Danish Air Transport Company has conducted an air service between Copenhagen and Hamburg for the carriage of mails, goods and passengers (*vide* also under Germany). In order to keep pace with the demands of external air traffic the Danish Government has decided to construct a large aerodrome at Kastrup, on the outskirts of Copenhagen, where accommodation both for aeroplanes and seaplanes will be provided, together with a wireless station fitted with apparatus for communicating with aircraft in the air.

(ii) *Norway.*—An air mail service between Christiania and Christiansand was carried out by Government machines during the summer months, as a result of which valuable experience was gained. As the result of a three months' contract between the Norske Luftrederei and the Norwegian Post Office an air mail service, employing four British flying boats and two German seaplanes, has been operated between Stavangar and Bergen, but this service was withdrawn on October 15th. Of the 168 trips scheduled 157, or 93·5 per cent., were satisfactorily performed.

(iii) *Sweden.*—Air regulations were embodied in a Royal Decree of July 16th and came into force on October 1st.

Spain.

The Ministry of Public Works, under which the Department of Civil Aviation is constituted, has issued the following Royal Orders supplementing the Decrees of November 25th, 1919, for the regulation of civil air navigation: Regulations respecting application for the registration of aircraft of Spanish nationality (March 6th, 1920); regulations governing the issue of licences to the personnel of aircraft (April 4th, 1920); and regulations governing the issue of permits for foreign aircraft to enter and fly over Spanish territory (May 5th, 1920).

The Government is considering the establishment of air mail services, and a Royal Decree of May 6th, drawn up at the instance of the Minister of the Interior, provides for the opening of three routes, viz., from Seville to El Araish (Morocco), from Barcelona to Palma de Majorca, and from Malaga to Melilla. Tenders have been invited from private contractors.

The French Latecoere Company continues to operate the mail service between Barcelona, Alicante and Malaga, this route forming part of the Toulouse—Casablanca line.

The local Government of the Canary Islands is interesting itself in plans for the inauguration of an inter-island air service, and has appointed a committee to investigate the question of aerodromes and seaplane bases. The distance between the two main islands, Teneriffe and Grand Canary, is about 40 miles and the passage by local steamer takes about six hours.

Switzerland.

Efforts have been made to commence air traffic on a co-operative basis between Switzerland, France and Great Britain. In July a service was started between Paris and Geneva, but after running for a short time it was temporarily suspended owing to the divergence between the legislation of the two countries.

An Agreement has been concluded between Switzerland and Germany on similar lines to the Swiss agreement with Great Britain, and is provisionally in force pending ratification.

Arrangements have now been completed for a customs aerodrome and seaplane station at Geneva, and the Government has decided to increase the number of seaplane stations on the principal lakes.

It was reported in April that the Société Aero-Tourisme, Geneva, had amalgamated with the united companies Aero and Ad Astra of Zurich, the title of the new combine being the " Aero-Ad-Astra-Avion Tourisme."

During the spring of this year a Swiss aeronautical mission visited Italy for the purpose of inspecting seaplane factories.

ASIA.

Japan.

The Special Committee appointed to deal with civil aviation has been abolished and its place taken by an Air Bureau under the control of the Minister of War, which will encourage and supervise the development of other than purely military aviation. The policy of the Japanese Government is apparently to stimulate the construction of aircraft in Japan in order to secure independence of foreign supplies, and a combination of Japanese firms is said to be contemplating the formation of a company for the manufacture of aircraft.

On the other hand, the United States are endeavouring to gain a footing in Japan through the Curtiss Company, and in this connection it is reported that a group of American capitalists are proposing to establish aeroplane works in the country.

Siam.

Several demonstration flights have been organised by the Aeronautical Division of the General Staff for the purpose of testing air communication and demonstrating to the population the importance of the aeroplane as a weapon of war. Mails were despatched by the machines carrying out the experiment, as a result of which a number of districts have asked permission to prepare landing grounds.

AMERICA.

Mexico.

Regulations have been issued for the establishment of air routes for the service of the public. They lay down the conditions upon which concessions may be obtained by companies or private persons for this purpose, and provide, *inter alia*, for the operation of air services by Mexican companies and the employment of Mexican pilots.

South American States.

(i) *Argentine.*—A special commission has been appointed by the Ministry of Marine to study a proposed law for the regulation of civil air navigation.

The views of the Argentine Government on the subject of air mail services have been embodied in a report by the Postmaster General. The report accepts in principle the

granting of subsidies for air mail services which, it states, would necessarily be large for certain overland routes across difficult country. Seven main lines are specified as being of immediate importance and the terms on which concessions would be granted are outlined. It is suggested that as an experiment a standard surtax of 50 cents for every 20 grammes of air mails should be adopted.

A report of a special meeting of the shareholders of the Franco-Argentine Air Transport Company states that flights of over 20,000 kilometres have been carried out, and more than six hundred passengers transported without accident.

(ii) *Brazil.*—The Brazilian Government has decided not to grant monopolies to air transport companies, but to issue regulations permitting any form of private enterprise.

The French Mission is apparently making good progress in the training of the Brazilian Military Air Service.

(iii) *Chile.*—A new company called the Compagnie Franco-Chile has been formed, with a capital of 100,000*l.*, and an air line is proposed between Valparaiso and Santiago.

(iv) *Colombia.*—A Decree was signed on March 15th providing for the regulation of air navigation.

(v) *Peru.*—A law dated April 10th, 1920, provides that aircraft, engines and all apparatus for aviation purposes shall enter Peru free of duty.

Foreign countries are endeavouring to procure a market for their aeronautical material in Peru. Thus the Sociedad de Navigacion Aerea Itala-Peruana has been formed under Italian, and the Compania Nacional Aeronautica under American, auspices, while a French mission has been established in the country for some months.

An American company is reported to have inaugurated on August 2nd a service between Lima and Callao.

United States.

The principal effort in civil aviation is concentrated on the operation of air mail services by the Post Office. The original lines inaugurated in 1918 were from New York to Washington, Cleveland and Chicago. The Chicago line was subsequently extended to San Francisco with connections from Chicago to Minneapolis and St. Paul and to Omaha and St. Louis, and an appropriation of $1,250,000 was made for the extension. According to the Postmaster-General, between May, 1918, and January, 1920, these services operated over 473,210 miles, and carried 22,254,400 letters. Delivery was advanced by an average of 16 hours and an efficiency of 91·49 per cent. was maintained.

The costs works out at slightly less than $1 per mile, but the accounts do not clearly state whether this figure includes the important item of depreciation.

Contracts for three air mail services, at a total cost of $685,000 a year, have now been awarded by the Post Office to the Lawson Airline Company of Chicago. The contracts call for services from Pittsburgh to St. Louis *via* Cincinnati and Indianapolis, between New York and Chicago *via* Pittsburgh, and between New York and Atlanta *via* Washington. The company intends, as a private venture, to carry passengers in addition to mails.

The United States Post Office has, in addition, recently inaugurated a seaplane mail service between Key West and Havana which connects with the railway service from New York.*

The Tilson Bill to prevent the dumping of aircraft was introduced into Congress on May 28th and referred to the Committee of Ways and Means.

In March a number of insurance companies engaged in writing off aircraft risks formed the National Aircraft Underwriters' Association with the primary object of classifying pilots according to their ability and becoming the central bureau for information concerning aviation.

The Curtiss Company continues its activities in the Central and South American Republics and in the Far East, where Manila is being used as a centre.

The Legislature of the Philippine Islands has authorised the Governor-General to issue, with the consent of the Council, regulations governing air navigation.

[Signed] F. H. SYKES,
Controller-General of Civil Aviation.

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* It is understood that a Contract has been made by the Post Office for the operation of this service by the West Indies Airways Company.

APPENDIX.

APPENDIX.

Table of Continental Air Transport and Mail Services.

[This table does NOT *include the alterations and suspensions in force during the winter months.]*

Route.	Intermediary Stations.	Company.	Frequency and Time of Service.	Charges.			
				Mail. (In addition to ordinary postage rates.)	Freight.	Passengers.	
						Single.	Return.
UNITED KINGDOM.							
London—Paris... ...	—	Aircraft Transport and Travel (Airco)	*Daily.* Dept. London 9.30 a.m. Arr. Paris 11.45 a.m. Dept. Paris 3.30 p.m. Arr. London 5.45 p.m.	2*d.* per oz.	1–10 lbs. 2*s.* per lb. 11–30 lbs. 1*s.* 9*d* ,, 31–100 lbs. 1*s.* 6*d.* ,, 101 & upwards 1*s.* 3*d.* ,,	£10 10*s.*	£18 18*s.*
London—Paris... ...		Handley Page (H.P.) ...	*Daily.* Dept. London 12.0 noon Arr. Paris 3.0 p.m. Dept. Paris 12.0 noon Arr. London 3.0 p.m.	2*d.* per oz.	*Outward.* 1–100 lbs. 1*s.* 3*d.* per lb. Over 100 lbs. 1*s.* ,, *Homeward.* 1–50 kgm. 7 frs. per kgm. Over 50 kgm. 6 ,,	£10 10*s.*	£18 18*s.*
London—Paris... ...		Instone Airline	Dept. London, Monday and Thursday, 12.30 noon Dept. Paris, Tuesday and Friday, 12.30 noon	2*d.* per oz.	1–10 lbs. 1*s.* 9*d.* per lb. 11–25 lbs. 1*s.* 8*d.* ,, 26–50 lbs. 1*s.* 7*d.* ,, 51–100 lbs. 1*s.* 6*d.* ,, Minimum 5*s.* per packet	£10 10*s.*	£18 18*s.*
London—Paris... ...	—	Air Post of Banks ...	—	—	—	£10 10*s.*	£18 18*s.**

* Each single ticket entitles holder to a return for £8 8*s.*

London—Brussels ...	—	Handley Page	*Daily.* Dept. London 2.30 p.m. Arr. Brussels 5.0 p.m. Dept. Brussels 2.30 p.m. Arr. London 5.0 p.m.	2*d.* per oz.	*Outward.* 1–100 lbs. 1*s.* 3*d.* pes lb. Over 100 lbs. 1*s.* ,, *Homeward.* 1–50 kgm. 7 frs. per kgm. Over 50 kgm. 6 ,,	£10 10*s.*	£18 18*s.*
London—Amsterdam	—	Handley Page	*Daily.* *Outward.* Dept. London 3.0 p.m. Arr. Amsterdam 5.30 p.m. *Homeward.* Return on Tuesday, Thursday and Saturday. Dept. Amsterdam 11.0 a.m. Dept. Rotterdam 11.30 a.m. Arr. London 1.30 p.m. *Monday, Wednesday and Friday. Dept. Amsterdam 7.10 a.m. Dept. Rotterdam 7.30 a.m. Arr. London 9.0 a.m.	3*d.* per oz.	Charges as above	£15 15*s.*	—
London—Amsterdam	—	Aircraft, Transport and Travel in conjunction with Koninklijke Luchtvaartmaatschappij. (K.L.M.)	*Daily.* Dept. ... ... 10.0 a.m. Arr. ... ... 12.45 p.m.	—	—	£15 15*s.*	—

* Carries Danish and German mails that arrive at Amsterdam the night before.

Table of Continental Air Transport and Mail Services—*Continued.*

Route.	Intermediary Stations.	Company.	Frequency and Time of Service.	Charges.			
				Mail. (In addition to ordinary postage rates.)	Freight.	Passengers.	
						Single.	Return.
FRANCE—							
Paris—London ...	—	Messageries Aeriennes and Société Générale des Transports Aeriens	*Daily.* Dept. Paris 12.30 p.m. Arr. London 2·50 p.m. Dept. London 12.30 p.m. Arr. Paris 2.50 p.m.	75 c. per 20 grs	1–5 kgm., 9 frs. per kgm. 6–15 kgm., 8 frs. per kgm. 16–50 kgm., 6·50 frs. per kgm. Over 50 kgm., 6 frs. Minimum, 10 frs. Ad valorem, 1 per cent.	575 frs.	1,000 frs.
Paris—London... ...	—	Grands Express Aeriens...	Five days a week. Dept. London 11.0 a.m. Arr. Paris 1.30 p.m. Dept. Paris 11.0 a.m. Arr. London 1.30 p.m.	75 c. per 20 grs.	1–5 kgm., 9 frs. per kgm. 6–15 kgm., 8 frs. per kgm. 16–50 kgm., 6·50 frs. per kgm. Over 50 kgm., 6 frs. Minimum, 10 frs. Ad valorem, 1 per cent.	500 frs.	900 frs.
Paris—London... ...	—	Transaerienne	—	75 c. per 20 grs.	1–5 kgm., 9 frs. per kgm. 6–15 kgm., 8 frs. per kgm. 16–50 kgm., 6·50 frs. per kgm. Over 50 kgm., 6 frs. Minimum, 10 frs. Ad valorem, 1 per cent.	575 frs.	1,000 frs.
Paris—Brussels ...	—	Messageries Aeriennes and Société Générale des Transports Aeriens	Six days a week. Each company runs alternate days Dept. Paris 3.0 p.m. Arr. Brussels 4.50 p.m. (appr.)	75 c. for every 20 grs. up to 100 50 c. for every 20 grs. above	1–5 kgm., 7·50 frs. per kgm. 5–10 kgm., 6·50 frs. per kgm. 10–20 kgm., 5·50 frs. per kgm. 20 kgm. and over, 4·50 frs. per kgm. Minimum, 7·50 frs. per packet	300 frs.	450 frs.

Paris—Strassburg ...	—	Compagnie Franco-Roumaine d'Aviation	*Daily.* Dept. Paris 8.0 a.m. Arr. Strassburg 11.0 a.m. Dept. Strassburg 4.30 p.m. Arr. Paris 7.30 p.m.	0·75 frs. up to 20 grs. 1·50 frs. 20–100 grs. 2·25 frs., 100–200 grs.	10 frs. per kgm. or fraction	500 frs.	800 frs.
Toulouse—Casablanca	Barcelona ... Alicante Malaga Rabat	Latecoere	Dept. Toulouse, Tuesday and Saturday Dept. Casablanca, Tuesday and Saturday	1·25 frs. up to 20 grs.	20 frs. per kgm.	1,680 frs.	
Toulouse—Bordeaux ...	—	Aero-Transport du Midi et du Sud-Ouest	*Monday, Tuesday, Thursday and Saturday.* Dept. Toulouse 9.0 a.m. Arr. Bordeaux 10.25 a.m. Dept. Bordeaux 5.0 p.m. Arr. Toulouse 6.25 p.m.	—	1–5 kgm., 4·50 frs. per kgm. 5–10 kgm., 4 frs. per kgm. 10–20 kgm., 3·50 frs. per kgm.	250 frs.	450 frs.
Toulouse—Montpellier	—	Aero-Transport du Midi et du Sud-Ouest	*Tuesday, Wednesday, Friday and Saturday.* Dept. Toulouse 9.0 a.m. Arr. Montpellier 10.20 a.m. Dept. Montpellier 5.0 p.m. Arr. Toulouse 6.20 p.m.	—	1–5 kgm., 4·50 frs. per kgm. 5–10 kgm., 4 frs. per kgm. 10–20 kgm., 3·50 frs. per kgm.	220 frs.	400 frs.
Nîmes—Nice	Avignon ...	CompagnieAerienne Française	*Monday and Thursday.* Dept. Nîmes 8.15 a.m. Arr. Nice 10.30 a.m. Dept. Nice 5.30 p.m. Arr. Nîmes 8.15 p.m.	—	3 frs. per kgm.	300 frs.	500 frs.

Table of Continental Air Transport and Mail Services—*Continued.*

Route.	Intermediary Services.	Company.	Frequency and Time of Service.	Charges.			
				Mail. (In addition to ordinary postage rates.)	Freight.	Passengers.	
						Single.	Return.
BELGIUM—							
Brussels—London ...	—	S.N E T.A.	*Daily.* Leave Evere 3.0 p.m. Arr. London 5.30 p.m. Dept. London 2.30 p.m. Arr. Evere 5.0 p.m.	75 c. for each 20 gr. up to 100 gr., 50 c. for 20 gr. above 100.	1–5 kgm., 9 fr. per kgm. 6–16 kgm., 8 frs. per kgm. 16–50 kgm., 6 frs. 50 c. per kgm. Over 50 kgm., 6 frs. per kgm. Minimum, 10 frs. Ad valorem, 1 per cent.	400 frs.	650 frs.
Brussels—Paris ...	—	S.N.E.T.A.	*Daily.* Leave Brussels 8.0 a.m. Arr. Paris 9.50 a.m. (app.) Dept. Paris 3.0 p.m. Arr. Brussels 4.50 p.m.		1–5 kgm., 7·50 frs. per kgm. 5–10 kgm., 6·50 frs. per kgm. 10–20 kgm., 5·50 frs. per kgm. Over 20 kgm., 4·50 frs. per kgm.	400 frs.	650 frs.
HOLLAND—							
Amsterdam—London	—	Koninklijke Luchtvaart-maatschappij (K.L.M.) in conjunction with "Airco"	*Daily.* Dept. Amsterdam 3.10 p.m. Arr. London 5 45 p.m.	—	—	150 fls.	

Note.—*S.N.E.T.A.—Syndicat National pour l'Etude des Transports Aeriens.

GERMANY—							
Berlin—Copenhagen ...	Warnemünde Malmö	Deutsche Luftrederei ...	*Daily.* Dept. Berlin 12.30 p.m. Arr. Copenhagen 5.30 p.m. Dept. Copenhagen 8.0 a.m. Arr. Berlin 1.0 p.m.	*Abroad.* Postcards 40 pf. Letters— For each 20 grs. 40 pf. Printed matter— For each 50 grs. 100 pf.	*To Copenhagen and Malmö.* In addition to the express parcel rate.....30 mks. excess for each kg. or part of a kg.	1,200 mks.	—
Berlin—Bremen ...	—	Sablatnig	*Daily.* Dept Berlin 9.30 a.m. Arr. Bremen 1.0 p.m. Dept. Bremen 12.0 noon Arr. Berlin 3.30 p.m. Connecting— Bremen—Amsterdam Bremen—Hamburg—Copenhagen	*Inland.* Postcards 20 pf. Letters— Up to 20 grs. 20 pf. 20 ,, 50 ,, 80 ,, 50 ,, 100 ,, 160 ,, 100 ,, 250 ,, 240 ,, Printed matter— Up to 50 grs. 80 pf. 50 ,, 100 ,, 160 ,, 100 ,, 250 ,, 240 ,, 250 ,, 500 ,, 480 ,, 500 ,, 1,000 ,, 960 ,,	*Inland.* In addition to the express parcel rate.....15 mks. excess for each kg. or part of a kg.	900 mks.	—
Berlin—Wangerooge ...	Bremen ...	Sablatnig	*Daily* Dept. Berlin 6.0 a.m. Arr. Bremen 9.30 a.m. Arr. Wangerooge 10.20 a.m. Dept. Wangerooge 11.10 a.m. Dept. Bremen 12.0 noon Arr. Berlin 3.30 p.m.	20 pf., 1–20 grs.	*Inland.* In addition to the express parcel rate.....15 mks. excess for each kg. or part of a kg.	—	—
Bremen—Amsterdam	—	Sablatnig in conjunction with Koninklijke Luchtvaartmaatschappij (K.L.M.)	Arr. Bremen 1.0 p.m.* Dept. Bremen 1.30 p.m.* Arr. Amsterdam 4.50 p.m.* Dept. Amsterdam 8.50 a.m.† Arr. Bremen 11.30 a.m.†	*Abroad.* Postcards 40 pf. Letters— For each 20 grs. 40 pf. Printed matter— For each 50 grs. 100 pf.	*To Amsterdam.* In addition to the express parcel rate.....30 mks. excess for each kg. or part of a kg.	—	—
					To London. In addition to the express parcel rate.....50 mks. excess for each kg. or part of a kg.	120 fls.	—

* Tuesday, Thursday and Saturday. † Monday, Wednesday and Friday.

TABLE OF CONTINENTAL AIR TRANSPORT AND MAIL SERVICES—*Continued.*

Route.	Intermediary.	Company.	Frequency and Time of Service.	Charges.			
				Mail. (In addition to ordinary postage rates:)	Freight.	Passengers.	
						Single.	Return.
DENMARK— Copenhagen—Hamburg	—	Danish Aerial Transport Company	*Daily.* Dept. Copenhagen 9.30 a.m. Arr. Hamburg 11.30 a.m. Dept. for Bremen 12 noon Arr. Hamburg 1.0 p.m. (from Bremen) Dept. Hamburg 1.30 p.m. Arr. Copenhagen 3.30 p.m. To connect with— Hamburg—Amsterdam—London Hamburg—Berlin (*via* Bremen)	*Postcards* *Letters* To Germany 10 ore 20 ore To Holland 20 ,, 40 ,, To England 30 ,, 60 ,,	—	125 fls.	—
UNITED STATES— New York—San Francisco	Chicago Omaha Salt Lake	U.S. Post Office	*Daily.*	2*d.* per oz.	—	—	—
New York—Washington	—	U.S. Post Office	*Daily.*	2*d.* per oz.	—	—	—
Chicago—St. Paul, Minneapolis	—	U.S. Post Office	*Daily.*	2*d.* per oz.	—	—	—
Chicago—St. Louis ...	—	U.S. Post Office	*Daily.*	2*d.* per oz.	—	—	—
Key West—Havana ...	—	U.S. Post Office	*Daily.* *Dept. Key West 11.0 a.m. (for Havana) †Dept. Havana 5.0 p.m. (for Key West)				

* Train from New York arrives Key West 10.50 a.m.

† Connects train to New York 9.0 p.m.